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(54) SOUND BROADCASTING EQUIPMENT

(71) We, MUSIC HIRE GROUP LIMITED, of Low Lane, Horsforth, Leeds, West Yorkshire, LS18 4ER, (formerly of Horsforth Hills, Butcher Hill, Horsforth Nr. Leeds in the County of York), a British company, do hereby declare this invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to sound broadcasting equipment and in particular to equipment for playing music or other sound which has been pre-recorded in some way. When used herein the term "means for playing a pre-recorded sound source" is intended to include within its scope such items as a record or tape deck or cassette player but this term itself is not intended to include the usual amplifier and one or more loudspeakers which are normally associated with the record deck or the like.

When pre-recorded music is being played to an area such as a room where people are present, for instance, a coin-operated playing machine in a public house, there will often be a significant background noise which may vary with the number of occupants in the room and has also been noted to vary with the time of day. Thus for instance it has been noticed that during the evening the background noise level tends to be higher than in the morning or early afternoon.

Although coin-operated record playing machines (COP's) in public houses are normally provided with a volume control, it would be unduly burdensome for the landlord or assistant to have to adjust the volume to match the rise and fall in the background noise level. However without fairly frequent adjustment of the volume the sound level of the music will not be at a satisfactory level for more than a short period. If the music cannot be heard then

customers are unlikely to want to hear further records.

According to the present invention there is provided sound broadcasting equipment comprising means for playing a pre-recorded sound source, an amplifier and a loudspeaker for amplifying and broadcasting the sound from the sound source to an area, the loudspeaker being arranged for the detection of sound in said area, and electronic means for utilising the signal from the so arranged loudspeaker to control said amplifier so as to vary the volume of the sound being broadcast according to the level of background noise in said area.

Preferably electronic means include means for sampling the background noise in the area sound is not being broadcast by the equipment.

Equipment in accordance with the present invention will accordingly be such that the volume of sound being broadcast is adjusted automatically to a level appropriate to the background noise in the particular area and so there is no need for any manual adjustment of the sound level.

Embodiments of the present invention will now be described, by way of examples only, and with reference to the accompanying drawings, in which:-

Figure 1 is a circuit diagram for sound broadcasting equipment in accordance with the present invention;

Figure 2 shows wave forms illustrating the operation of the equipment of Figure 1; and

Figure 3 illustrates the relationship between the setting of the volume control and the output for the remote volume control amplifier of the equipment of Figure 1.

Referring to Figure 1, an embodiment of equipment in accordance with the present invention comprises equipment wherein sampling of the signal from the sound receiving loudspeaker takes place while sound is not being broadcast. The equip-

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ment includes a pickup 51 for a record deck which is connected to a preamplifier and voltage control attenuator 52 which is connected in turn to a conventional power amplifier 62. The output of the power amplifier 62 is fed to a loudspeaker 63 via a switch arrangement 61. Switch arrangement 61 is controlled by a voltage detector circuit 59 which is connected to the line between components 52 and 62 and also to switch arrangement 61. Voltage detector circuit 59 is arranged to detect a signal from attenuator 52 and then to cause switch arrangement 61 to switch to allow the signal from power amplifier 62 to be fed to the loudspeaker 63. When the signal from attenuator 52 ceases, or drops below a certain threshold value, detector circuit 59 causes switch arrangement 61 to switch so that no signal is fed from amplifier 62 to loudspeaker 63. Instead the loudspeaker 63 which acts as a microphone, is connected through switch arrangement 61 to amplifier and signal conditioning circuit 55. This circuit amplifies the very low level signal from loudspeaker 63, the resultant signal being fed to an integrator 56 which is connected in turn to a sample and hold circuit 58. The latter is also connected to the voltage detector circuit 59 and the arrangement is such that when there is no signal from attenuator 52 then the sample and hold circuit 58 is in the sample mode. When the circuit 59 detects a signal from attenuator 52 then the sample and hold circuit 58 changes to the hold mode and the last output of the integrator 56 is then held during the period of signal output from attenuator 52. The output of sample and hold circuit 58 is used to control attenuator 52 but is first modified by a linear amplifier 57 so that the characteristics of the output of the integrator 56 match that of the attenuator 52.

The system is also provided with a remote volume control 65 which enables the initial level of the output of amplifier 57 to be controlled by, for instance, the Landlord of a public house in which the system is installed. The manner in which the output of amplifier 57 varies with the setting of the remote volume control is illustrated in Figure 3 and it will be seen that below setting indicated by A the output is zero. Above this setting the output increases from a level B approximately linearly. In this way the Landlord of a public house can switch off the output altogether by simply moving the control to a position corresponding to A or below at, for instance, closing time. However, at any position above the complete switch off point A the output from amplifier 57 is such that a significant level of sound is broadcast. In other words the Landlord has no control over the level of sound below a certain value other than to

switch off the sound altogether; above this level he may set a starting level which is then adjusted by the automatic volume control action. The system may also be provided with a separate mute input 67 which may provide a separate input voltage detector circuit 59. The purpose of this separate mute 67 is to provide an advance warning that music is about to be played. For instance, mute input 67 could be controlled by some mechanical action of the record-playing equipment such as the selection of a new record or the movement of the pickup arm. In this way there will be not loss of the beginning of the record which could happen when it is the signal from the pickup which itself is used to control the voltage detector circuit 59.

The control voltage at the output of the linear amplifier 57 is directly proportional to the noise sound pressure level in the area to which music or the like is to be broadcast so that, since the response of the ear is logarithmic, there is produced a subjective linear effect.

Referring to Figure 2, plot (a) shows how the background noise in an area such as a public house may vary with time. Plot (b) shows the total noise which includes that from the sound broadcasting equipment which is playing music during time periods A and B. Plot (c) shows the contribution to the sound made by the sound broadcasting equipment itself and (d) shows the electrical signal being passed through amplifier 57 by sample and hold circuit 58 and switch 61 of the circuit of Figure 1. The output of preamplifier 52 of the circuit of Figure 1 is then determined by the level of noise detected by sound receiving loudspeaker 63 prior to a particular record being played and the increase u' in the output from amplifier 62 represents the increased loudness over the background noise in order to achieve audibility.

WHAT WE CLAIM IS:-

1. Sound broadcasting equipment comprising means for playing a pre-recorded sound source, an amplifier and a loudspeaker for amplifying and broadcasting the sound from the sound source to an area, the loudspeaker being arranged for the detection of sound in said area, and electronic means for utilising the signal from the so-arranged loudspeaker to control said amplifier so as to vary the volume of the sound being broadcast according to the level of background noise in said area.

2. Sound broadcasting equipment according to claim 1 wherein the electronic means includes means for sampling the background noise in the area when sound is not being by the broadcast by the equipment.

3. Sound broadcasting equipment

according to claim 2 wherein the electronic means further includes signal cut-off means arranged to cut off the signal from the loudspeaker to the sampling means when
5 sound is being broadcast or about to be broadcast by the equipment and means for controlling the amplifier when the sound is being broadcast.

4. Sound broadcasting equipment
10 according to claim 1 and substantially as herein described.

5. Sound broadcasting equipment substantially as described with reference to
15 Figure 1 of the accompanying drawings.

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